

COVER PREFERENCES, SEASONAL MOVEMENTS, AND FOOD HABITS OF RICHARDSON'S GROUSE AND RUFFED GROUSE IN SOUTHERN IDAHO

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FROM September 1938 to September 1940, while carrying on field studies of fur-bearers in the Boise National Forest in southern Idaho, I gathered data on Richardson's Grouse (*Dendragapus obscurus richardsoni*¹) and the Idaho Ruffed Grouse (*Bonasa umbellus phaios*²) with a view to determining their occurrence in the various timber types and other cover, their seasonal movements, and their food habits.³ All of the field work was done on foot or on snowshoes, most of it in the vicinity of the Deer Park Guard Station in the center of the Forest, although trips were made to various other places in the Boise, as well as to the Payette and Idaho National Forests. A wide-ranging bird dog was used when the ground was not covered with snow. These particular grouse were chosen for study because, of the six upland game birds native to Idaho, only these two have borne a substantial hunting burden since 1937, and ecological data concerning them were particularly desirable as a basis for planning management to increase their numbers.

Half the records on Richardson's Grouse and a quarter of those on the Ruffed Grouse were made on the drainage area of Horseheaven Creek, between 4,500 and 8,750 feet above sea level; the cover relationships of the area are shown in Figures 1 and 2. The nearest weather station is at Atlanta, some 20 miles away, at an elevation of 5,400 feet. There the mean annual rainfall is 23.5 inches, which includes an average of 138.9 inches of snowfall; in July and August, less than an inch of rain falls, and temperatures up to 106° F. have been recorded (U. S. Dept. Agric., 1941). Figure 3 shows where the two species of grouse were found in the Horseheaven Creek area.

RICHARDSON'S GROUSE

From October through March, Richardson's Grouse were found above 6,000 feet elevation in the Douglas fir-pole, Douglas fir-protective (Figure 4), and subalpine types (Figure 5).⁴ After snow covered the

¹ J. W. Aldrich, in a letter dated August 28, 1942, describes skins taken in the area as "intermediate between *richardsoni* and *pallidus* but probably a little closer to the latter."

² J. W. Aldrich and H. Friedmann, *Condor*, 45 (1943):98.

³ H. H. T. Jackson directed the study; Guy B. Mains cooperated in many ways; Robert E. Stewart made many of the food habits analyses and helped with others. Figures 4, 5, and 6 are Fish and Wildlife Service photographs taken by the author.

⁴ A protective type is "any stand of scattered trees which is principally of value for watershed protection" (U. S. Forest Service, 1928). A subalpine type is "a stand containing a varying mixture of subalpine species—at the upper limit of tree growth" (U. S. Forest Service, 1925).

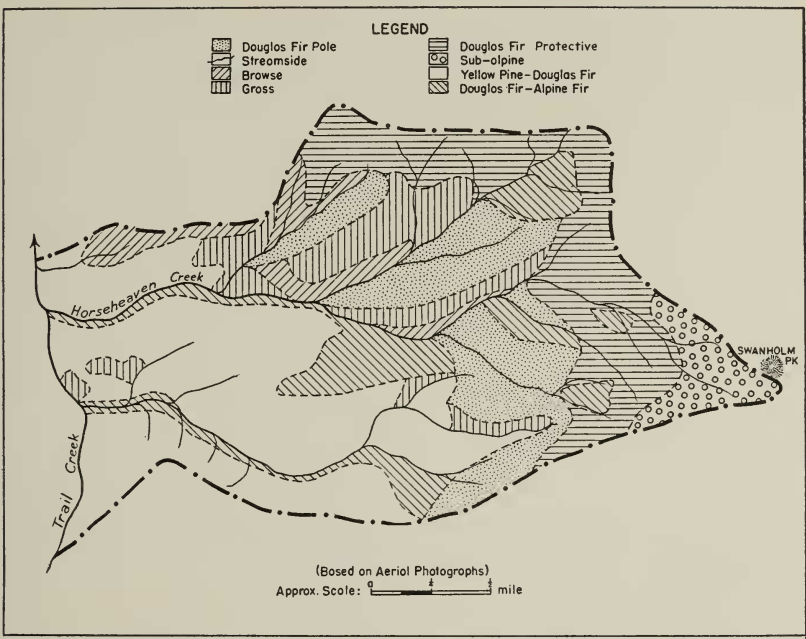


Figure 1. Cover map of the Horseheaven Creek drainage area.

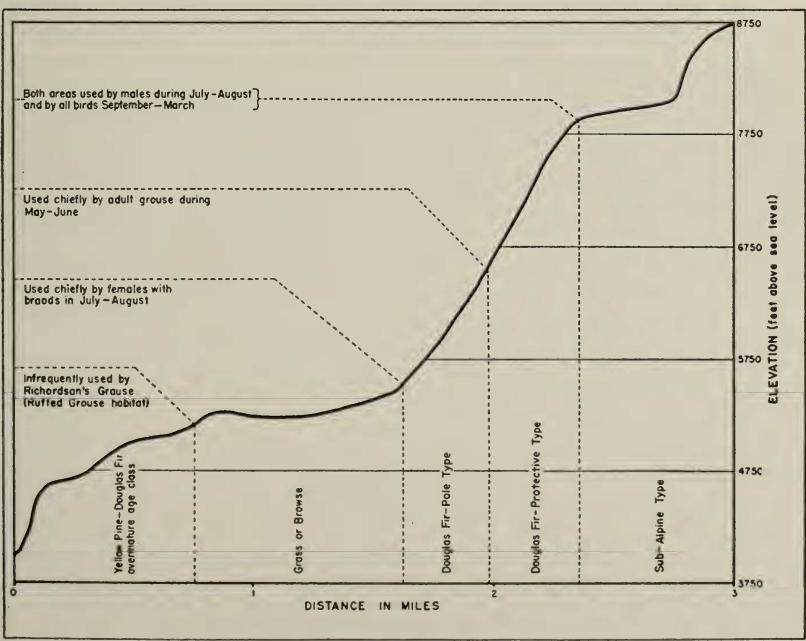


Figure 2. Diagrammatic representation of cover relationships and Richardson's Grouse movements in the Horseheaven Creek drainage area.

ground in mid-November, the birds spent most of their time in trees, and one might snowshoe an entire day at this season without seeing a track. In the Deer Park area they were most commonly found in trees of Douglas fir (*Pseudotsuga taxifolia*), although whitebark pine (*Pinus albicaulis*), alpine fir (*Abies lasiocarpa*), and Engelmann spruce (*Picea Engelmannii*) were also present, and grouse were flushed from them on occasion. Observations in other areas showed that where these other trees were more abundant they were more extensively used by the grouse. The birds sometimes burrowed into the snow to roost at night.

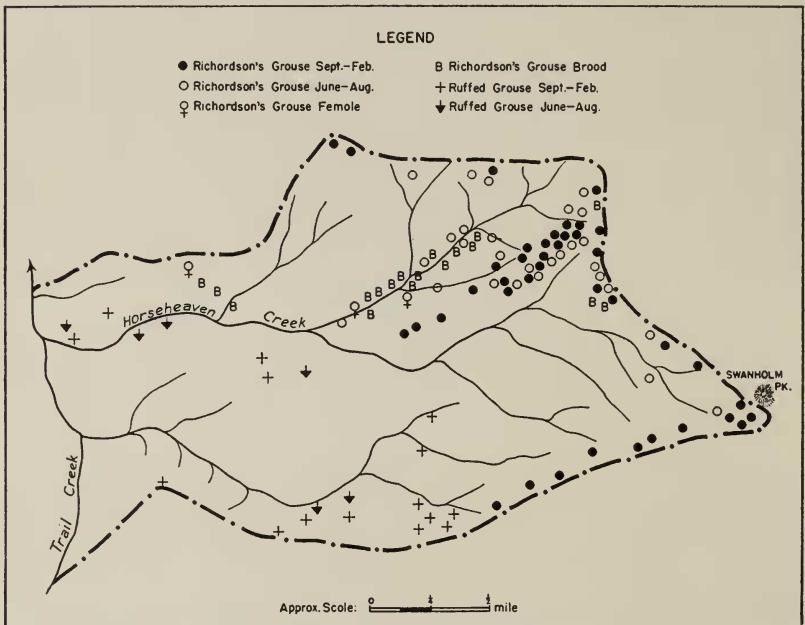


Figure 3. Distribution of grouse records in the Horse Heaven Creek drainage area, 1939-1940.

In these months, evergreens were used not only for shelter but also for food. Droppings, often one-half to one inch deep under certain trees, were found upon repeated field examinations to be composed entirely of the needles and buds of conifers. The contents of the crops of nine birds killed in the study area in the winter months consisted of 99 per cent needles and buds of Douglas fir. The remaining one per cent consisted of buds of western chokecherry (*Prunus demissa*),⁵ found in two stomachs.

An interesting detail of the winter food habits of this bird is the retention of grit in the gizzard. For at least four months of the year, Richardson's Grouse stay in areas where the snow is 6 to 15 feet deep,

⁵ The *Range Plant Handbook* (U. S. Forest Service, 1937) was used for names of plants other than trees.



Figure 4. Douglas fir-protective type. Horseheaven Creek, September 27, 1939. The conifers are Douglas fir; the shrubs, wax currant and snowberry.



Figure 5. Subalpine type. Hunter Creek, February 20, 1940. The conifers are whitebark pine.

and where there are no bare spots (Figure 5). Gizzards of four birds shot in February contained as much quartz gravel (7.5 to 8.0 cc. each) as the gizzards of eight birds taken during July and August, when the ground was bare. Beer (1944:40) reports that the amount of grit in 121 gizzards of this subspecies (taken in all months of the year except March and May) "varied from none to 16 cc., and averaged about 6 to 8 cc." per bird.

In May, June, and early July, Richardson's Grouse were found at lower elevations in the Douglas fir-pole stands. They continued to use the trees for escape but remained on the ground until they were disturbed. Ninety-four per cent of the crop contents of five adults taken



Figure 6. Opening in ponderosa pine type. Horseheaven Creek, August 17, 1940. The conifers are ponderosa pine and Douglas fir; the shrubs, mountain ash, service berry, willow, and snowbrush.

during this period consisted of the flowering parts of various plants.

In late July and early August the females and broods were concentrated at still lower altitudes near the stream (Figure 3), where during mid-day they remained in a narrow band of alder (*Alnus tenuifolia*) and willow (*Salix* spp.). In the mornings and evenings they moved into the adjacent "browse" (brush) and grass to feed. The plant materials in the crops of 10 birds collected in early August consisted almost entirely of the fruits and leaves of various shrubs, with wax currant (*Ribes cereum*) predominating. Every bird had taken some insects, while one was "stuffed" with grasshoppers (*Melanoplus bivittatus*). During this period, single birds (those identified proving to be adult males) were found in the higher timber types, above 6,000 feet, frequently at considerable distances from water, as shown by the open circles in Figure 3.

By mid-August the broods began to move upward to the higher ridges, and a month later all the birds were found in the Douglas fir (pole or protective) types or in the subalpine type. Here the birds were usually in or near extensive patches of wax currants, although they were returning to a conifer needle diet, as shown by the contents of two crops.

In the Horseheaven Creek area, these seasonal movements involved distances up to two miles and elevational changes of at least 2,000 feet. However, elsewhere in the region, both the distances and elevational changes were much more extensive. This was particularly true of Trinity Ridge, which lies between the middle and south forks of the Boise River and connects large areas of "browse" and grass types of the middle watersheds with the tremendous acreage of protective and subalpine types of the Sawtooth "high country." In July 1940, I spent four days in this high country with a wide-ranging dog and was unable to find a single grouse, but numerous droppings, consisting entirely of conifer needles and buds, were found under dense trees, indicating that many Richardson's Grouse had wintered in the area.

Table 1 shows the frequency of occurrence of Richardson's Grouse by month and cover type.

IDAHO RUFFED GROUSE

During the entire year the Idaho Ruffed Grouse were found in the overmature ponderosa pine and Douglas fir-spruce types of the Deer Park study area (Table 2). These forest types have a rather broken canopy, and a wide variety of shrubs grow under the many openings (Figure 6).

Snowfall at these lower elevations was considerably less, and snow interception by the crowns of trees much greater, than on the higher ridges. Hence many shrubs were not covered by snow, and there were often small bare areas during the winter. The crops of three Ruffed Grouse collected during the winter months contained leaves and buds of the herb phacelia (*Phacelia* spp.), mountain ash (*Sorbus scopulina*), service berry (*Amelanchier alnifolia*), and Douglas maple (*Acer douglasii*). The birds descended to the snow frequently, walking and feeding among the branches of the shrubs. Sixty-three records of plants taken (as shown by tracks and the accompanying fresh marks on the shrubs) during January, February, and March were distributed as follows: 18 at western chokecherry, 11 at willow, 10 at Douglas maple, 10 at service berry, 6 at mountain ash, 5 at black cottonwood (*Populus trichocarpa*), and one each at dogwood (*Cornus stolonifera*), mountain snowberry (*Symphoricarpus oreophilus*), and snowbrush (*Ceanothus velutinus*).

In contrast to Richardson's Grouse, the movements of this bird were apparently quite restricted. Certainly there were no general shifts in

TABLE 1
MONTHLY DISTRIBUTION OF RICHARDSON'S GROUSE RECORDS BY COVER TYPES

Cover type	Times observed												Total
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Streamside								15	9	1*			25
Grass								1					1
"Browse"								3	2				5
Douglas fir (pole)	3	11	3		3	4	6	8	7	2	5	6	58
Douglas fir (protective)	1	6				1	6	3	4	6	1	1	29
Subalpine	4	9	1				1	6	12	1	6	1	41
Total records	8	26	4	0	3	5	13	36	34	10	12	8	159
Total individuals	12	41	4	0	3	6	21	78	93	20	22	13	313

* Bird apparently driven down by shooting on opening day of deer season.

TABLE 2
MONTHLY DISTRIBUTION OF IDAHO RUFFED GROUSE RECORDS BY COVER TYPES

Cover type	Times observed												Total
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Douglas fir-spruce	13	10	3		2		2	7	1	1	3		42
Ponderosa pine	13	21	2		3	1	1	1			1	1	44
Total records	26*	31*	5*	0	5	1	3	8	1	1	4	1	86
Total individuals	4	6	1	0	5	1	13	18	1	1	6	1	57

* Many of these were track observations.

use of different altitudes or cover types. As indicated in Figure 3, Ruffed Grouse broods were concentrated near the streams during the summer months.

DISCUSSION

Use of conifers as escape cover. The two species showed very similar reactions to my approach. They nearly always "froze" and rarely flushed until I had approached to within 20 feet. When flushed, they almost invariably used conifers for cover, where they remained very still. Thus, of 258 Richardson's Grouse seen to alight after being flushed, 250 chose conifers and only 8 the ground; of 42 Ruffed Grouse, 41 were seen to alight in conifers. Except in the case of broods, whose members usually flew only a short distance, and often all to one tree, this was a very effective procedure, because the birds blended perfectly with the foliage and had to be searched for diligently even when I had observed the particular branch on which they had stopped.

Movements of Richardson's Grouse. Judging from the food habits data from the study area, which agree closely with reports by Stewart (1944) and Beer (1943), it would seem that the Richardson's Grouse movements were correlated with the increasing delay in plant development with increasing altitude. Costello and Price (1939) state that "the rate of development [of plants] varies with altitude, being delayed from 10 to 14 days with each 1,000 feet increase in elevation." Thus the downward spring movements, when the birds changed from a diet of conifer needles to one of various flowers and fresh tender leaves, "gained" 20 to 28 days in the Horseheaven Creek area and at least 50 days in the Trinity Ridge area. Further, the return of the birds to a higher altitude in August apparently coincided with the late ripening of the wax currants in the subalpine type. At this time, the fruits of service berry, chokecherry, and snowberry had deteriorated at lower elevations. Beer (1943:41) states: "Blue grouse tend to follow the ripening of the berries in the fall migration to the higher levels where they spend the winter." Anthony (1903), Saunders (1921), and Lincoln (1939), as well as Wing, Beer, and Tidyman (1944), have also noted these seasonal movements.

Relation to land use. During the winter, Richardson's Grouse are in areas practically unaffected by man. These protective forests have no commercial value; the forage can be used by sheep to only a limited extent, and only in the late summer. Further, much of the area is inaccessible to the flocks. The opposite is true of the nesting and rearing areas of this grouse, which are accessible and are intensively used for spring and early summer range by domestic sheep. Renner (1930) and Spence (1937) reported serious deterioration of natural cover on the Boise River watershed due to over-grazing by sheep at these lower

elevations, which are the browse, grass, and streamside types used by the grouse in June, July, and August. Sheep grazing in these areas, however, is being steadily reduced. The Ruffed Grouse is found in timber types where there is little grazing by domestic sheep. Some lumbering is carried on in these types, but under the present policy of administering public lands, this will probably not become an actual danger to the grouse habitat. Other land uses of the area include trapping, mining, and recreation. None of these has been destructive of grouse habitat in the past. However, all of them increase the drain on grouse populations through poaching.

Effects of hunting. Hunting of the two grouse decreased greatly in popularity with the development of pheasant populations in the irrigated portions of the state. Grouse hunting seasons in southern Idaho opened during August for many years. Until 1927, the seasons were from August 1 to September 30 or even later, and the bag limit was six or more. Then the season was shortened to two weeks, and in 1939, the bag limit was cut to four. In 1940 the season was shifted to September 1-10. There has been no grouse season since that year. Because most of the mountain roads are along canyon bottoms (in the Boise Forest an estimated 750 of 850 miles are thus located), the August season made young birds and the accompanying females particularly vulnerable to hunting pressure. A season in September, when the broods are at higher altitudes farther from the roads, automatically provides protection. Also, instead of being able to shoot at very young birds that have flown to the nearest tree, the hunter is confronted with older birds that, when flushed, strike out strongly and sail *down* from the high, open ridges. This type of flight calls for a different shooting technique from that required for most other upland game birds, which fly *up* and away when flushed.

Estimating numbers. The concentration of broods of both these species of grouse along stream bottoms in July and August simplifies the problem of brood counts. The streams are the most accessible areas, and their gradient is, as a rule, very steep. Since young grouse fly *down* hill, a bird dog trained to flush birds at close range can be worked upstream, and the birds counted, as they fly overhead, without fear of duplication.

Management possibilities. Since forest areas in Idaho are managed by a small staff, no intensive program of development for these grouse seems possible at present. Continued improvements in range management practices on the spring and early summer ranges and a flexible September hunting season based on brood estimates made in early August will build up the present grouse populations without interfering with the several other uses of the area.

SUMMARY

Field observations over a two-year period (1938-1940) were made in the Boise National Forest on the cover preferences, seasonal movements, and food habits of Richardson's Grouse (*Dendragapus obscurus richardsoni*) and the Idaho Ruffed Grouse (*Bonasa umbellus phaios*).

From October through March, Richardson's Grouse lived on the higher ridges, where they were dependent on scattered stands of conifers for both food and cover. In May, June, and early July, they stayed at lower elevations and ate chiefly the flowering parts of various plants. In late July and early August, broods and females were concentrated along water courses, while single birds (those identified proving to be adult males) were in the higher timber types. The food at this time consisted largely of insects, berries, fruits, and leaves of various shrubs. By mid-September the females and broods had moved to the higher ridges, where at first they continued to feed on berries and leaves of shrubs and later shifted to a diet of conifer needles and buds.

Idaho Ruffed Grouse were found in the overmature ponderosa pine and Douglas fir-spruce types at middle elevations throughout the year. During the winter they fed largely on the buds of a wide variety of shrubs which grow under openings in the forest canopy. The movements of this grouse are apparently quite restricted.

Both species of grouse were dependent during the entire year on coniferous trees for escape cover.

The movements of the Richardson's Grouse seem to be influenced by the differing rates of plant development at different altitudes.

The summer range of the Richardson's Grouse is in areas intensively used by man and livestock, but the winter range is in areas relatively unaffected by man. Although some lumbering is carried on in the range of the Ruffed Grouse, it does not seriously endanger the grouse habitat. Grouse hunting has decreased in recent years.

Brood counts along water courses in August furnish a dependable basis for estimates of yearly population increase.

Continued improvements in range management practices on the spring and summer ranges and the use of a flexible September hunting season based on August brood counts should be adequate to build up the grouse populations of the area.

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